

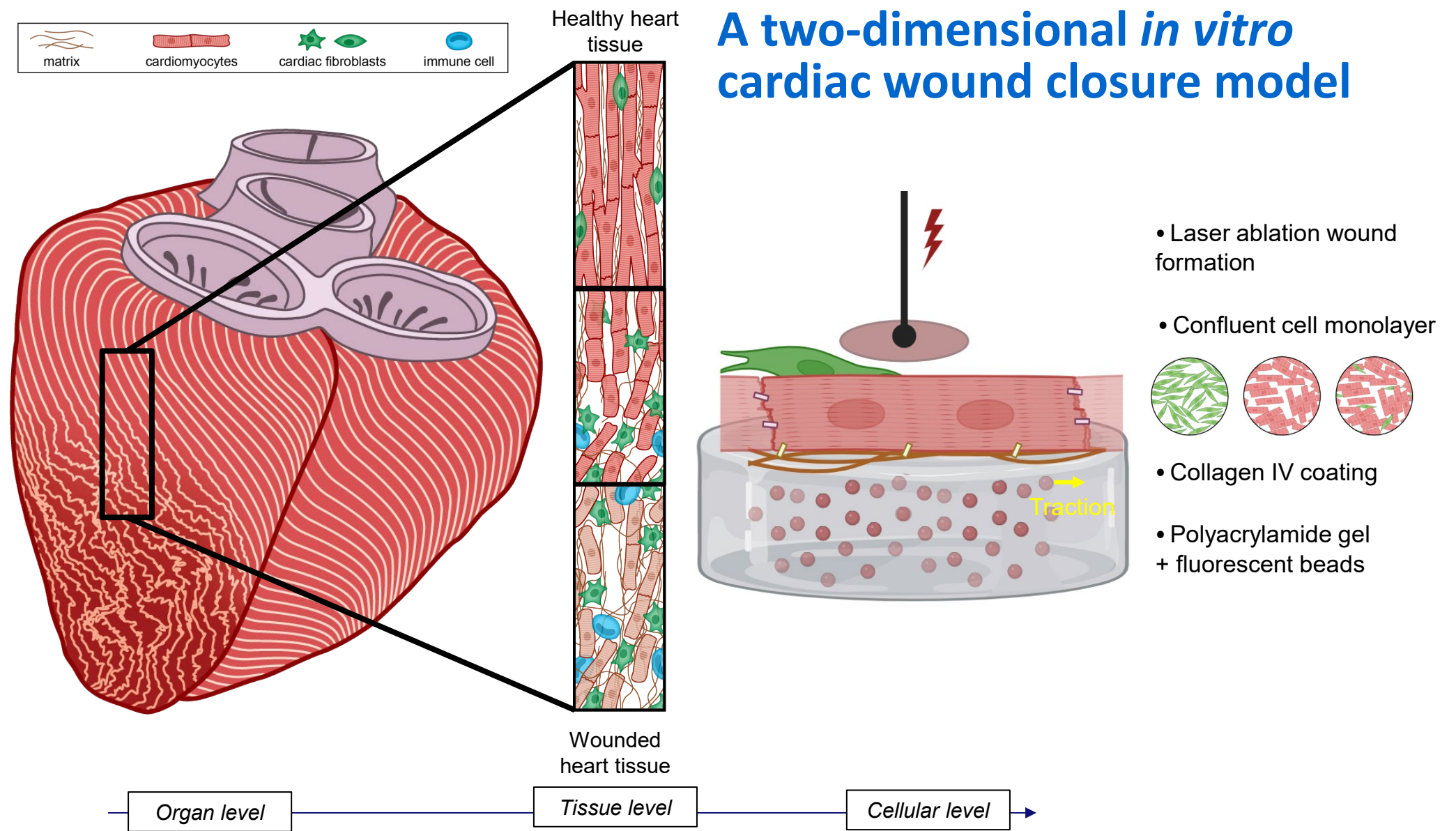
# Mechanobiological Response of Cardiac Tissue Mimics Following Injury

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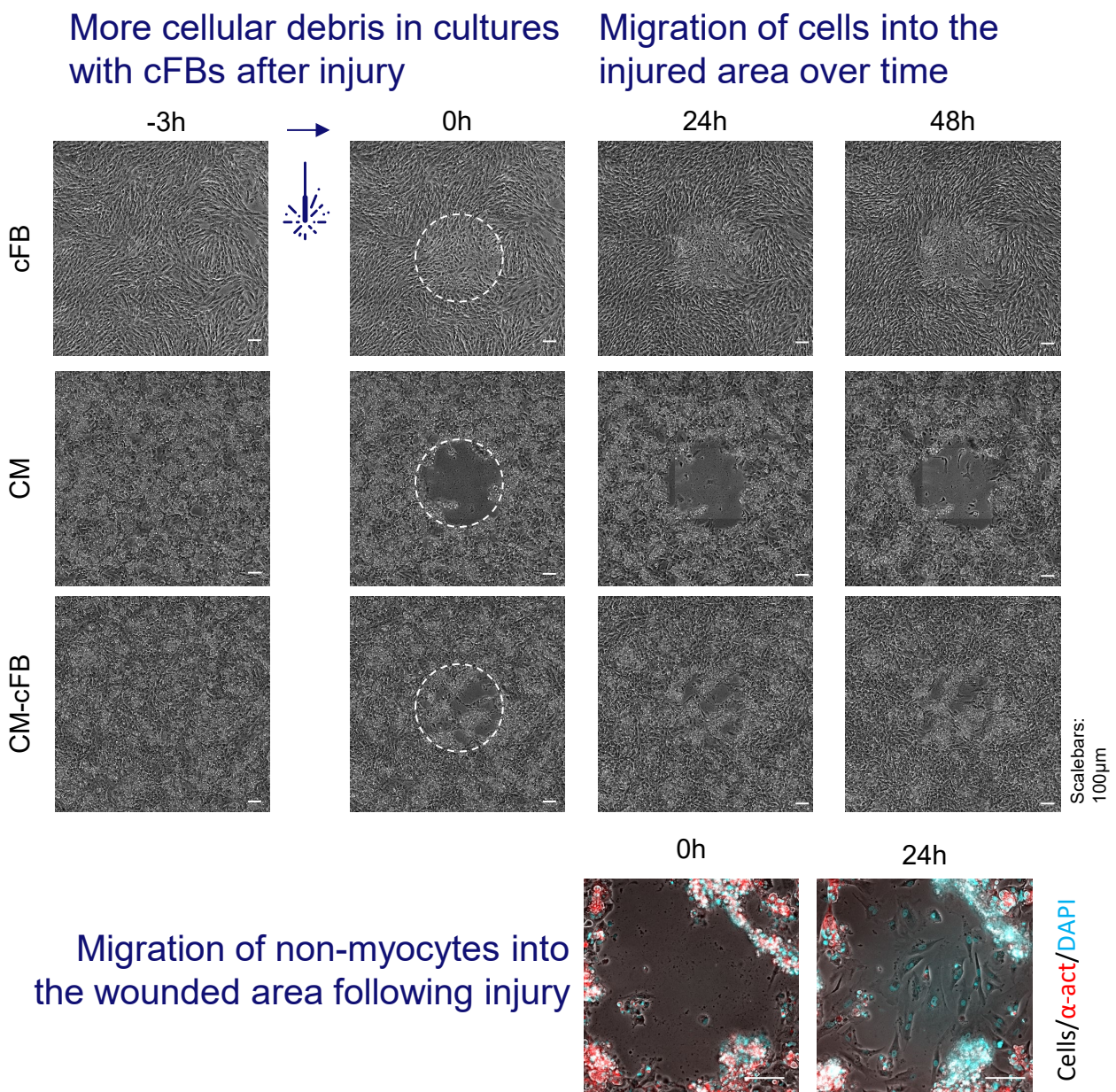
Biomedical Engineering | Soft Tissue Engineering and Mechanobiology

## Background

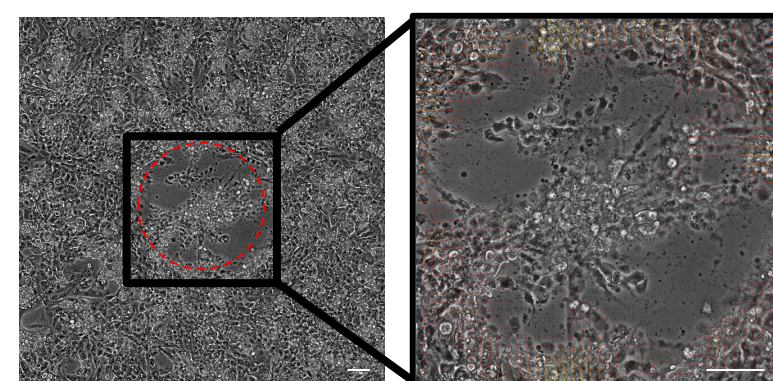
Following tissue wounding in the heart, such as myocardial infarction, widespread cardiomyocyte death creates a non-contractile region within otherwise beating heart tissue. Cardiac fibroblasts are recruited to this area to drive extracellular matrix deposition and scar formation, but their mechanobiological interactions with cardiomyocytes in this dynamic environment remain poorly understood.



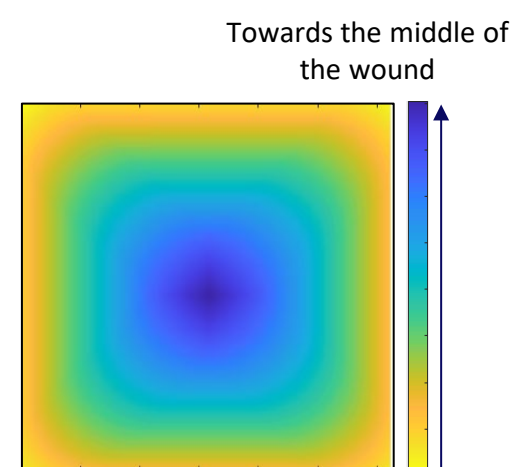
## Cellular dynamic behaviour after injury



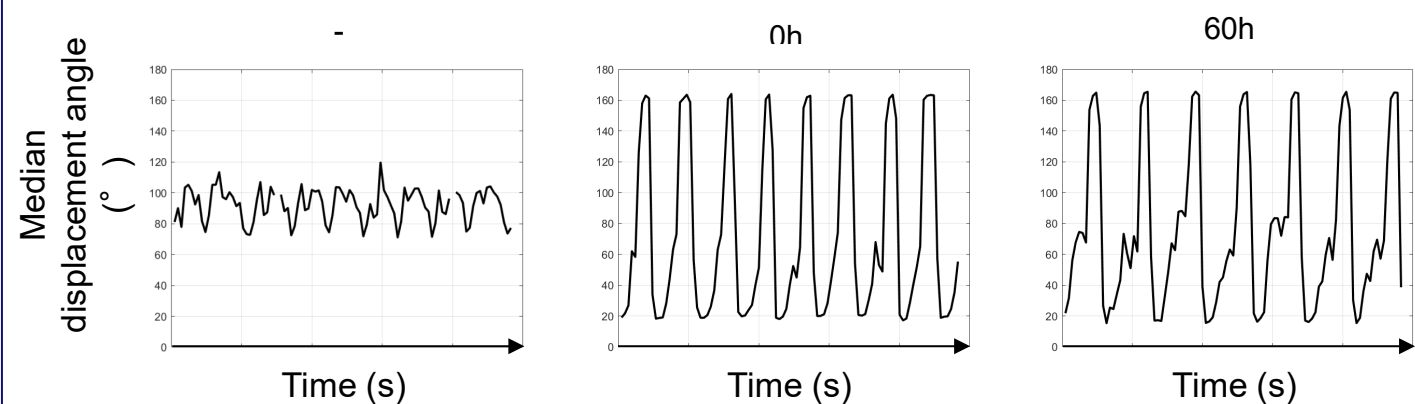
Cardiomyocyte monolayer contraction directed away from the wound edge after injury



Mask formation based on the wounded area

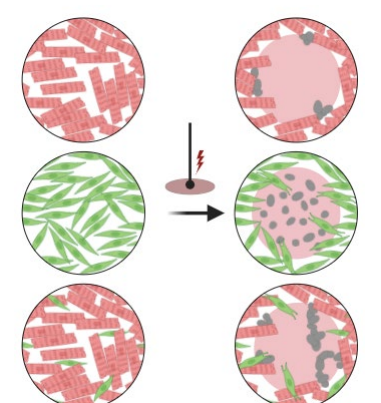


Angles of cellular displacements from PIV analysis show periodic directionality away from the wound



## Conclusion

- The *in vitro* model illuminates the early post-injury cellular behavior in a dynamic, self-contractile cardiac environment, whilst capturing mechanobiological features that can mimic part of the *in vivo* wound stabilization and fibrosis response.
- Resident fibroblasts and surrounding contractile tissue influence wound-closure dynamics, an important consideration for cell-based therapies injected in or near cardiac injuries.
- These insight are relevant for research in diminishing or even halting border zone expansion post-MI, and may leverage strategies to regenerate cardiac tissue



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